## Exhibit E

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IPR Declaration reference: ISLD-201911-001

## ETSI Rules of Procedure, 3 April 2019

| IPK   | NFURMATION  | N 2 I A I EMENI  | AND LICENS  | ING DECLARATION   |
|---|---|--|---|---|
|   | ISATION ("Declarant")                               | 7  |   |   |
|   | rporation   |  |   |   |
| CONTACT DETAILS FO                                    | OR LICENSING INFORM                                 | ATION:   |   |   |
| Name and Title:                                       | Dr. Chanho Min , Senior                             | <br>r Manager  |   |   |
| Department:   | IPR Dept.   |  |   |   |
| Address:  | (Korea Telecom Resear                               | ch Center, Umyeon-dong                                 | ) 151. Taebong-ro, Seoch                                    | o-gu, Seoul, 06763, South Korea   |
| Telephone:  | 82-10-9530-4765                                     |  | Fax:  | 82-303-0990-3806  |
| Email:  | chanho.min@kt.com                                   |  | URL:  |   |
| PR INFORMATION ST                                     | ATEMENT   |  |   |   |
| AFFILIA I ES DIESENI DE                               | liet that the IPK(S) disclos                        | sed in the attached <i>IPR In</i>                      | tormation Statement Anne                                    | forms ETSI that it is the Declarant's and/or its<br>ex may be or may become ESSENTIAL in relation<br>in the attached IPR Information Statement Annex. |
| The Declarant and/or its                              | AFFILIATES (check one                               | box only):   |   |   |
| are the proprieto                                     | or of the IPR(s) disclosed                          | in the attached IPR Inform                             | nation Statement Annex.                                     |   |
| are not the propriet                                  | or of the IPR(s) disclosed                          | in the attached IPR Infon                              | mation Statement Annex.                                     |   |
| PR LICENSING DECLA                                    | RATION  |  |   |   |
| n accordance with Claus                               |   | licy the Declarant and/or                              | its AFFILIATES hereby im                                    | evocably declares the following (check one box  |
| and/or its AFFILIATES a                               | re (1) prepared to grant in                         | NICAL SPECIFICATION (                                  | identified in the attached /i<br>this/these IPR(s) on terms | re or become, and remain ESSENTIAL in respect<br>PR Information Statement Annex, the Declarant<br>s and conditions which are in accordance with       |
| This irre   | vocable undertaking is m                            | ade subject to the condition                           | on that those who seek lice                                 | ences agree to reciprocate (check box if  |
| The Declarant and attached IPR Licensing I            | d/or its AFFILIATES are no Declaration Annex).      | not prepared to make the a                             | above IPR Licensing Decla                                   | aration (reasons may be explained in writing in the   |
| The construction, validity<br>Ferms in ALL CAPS on t  | and performance of this his form have the meaning   | IPR information statement<br>g provided in Clause 15 o | t and licensing declaration f the ETSI IPR Policy.          | shall be governed by the laws of France.  |
| SIGNATURE   |   |  |   |   |
| By signing this IPR Inform<br>AFFILIATES to the repre | nation Statement and Lic<br>sentations and commitme | ensing Declaration form, yents provided in this form.  | ou represent that you hav                                   | ve the authority to bind the Declarant and/or its   |
| Name of authorized pers                               | on:   | Dr. Chanho Min   |   |   |
| little of authorized person                           |   | Senior Manager   |   |   |
| Place, Date:  |   | •  | ch Center, Umyeon-dong                                      | ) 151, Taebong-ro, Seocho-gu, Seoul, 06763,   |
|   |   |  | 加加  | 乜   |

Please return this form duly signed to: ETSI Director-General ETSI - 650, route des Lucioles - F-06921 Sophia Antipolis Cedex – France / Fax. +33 (0) 4 93 65 47 16



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## ETSI Rules of Procedure, 3 April 2019

## **IPR Information Statement Annex**

|                          | STANDARD,                   | TECHNICAL SPEC               | IFICATION or   | 10-                 | Proprietor    | Application No.                          | on Stateme                | Patent/ApplicationTitle  | County 1                |                 |                    |                                 |
|--------------------------|-----------------------------|------------------------------|--|---------------------|---------------|--|---------------------------|--|-------------------------|-----------------|--------------------|---------------------------------|
| Disclos<br>ure<br>Number | Project or<br>Standard name | Work Item or<br>Standard No. | Illustrative<br>Specific part of<br>the standard (e.g. | Version<br>(V.X.X.X |               |  |                           | - greunapplication (Itle   | Country of registration | Other memb      | URTHER INFORMA     |                                 |
| 1                        | 3GPP-Release-13             | TS 136 331                   | Section)   |                     |               |  |                           |  |                         | Application No. | Publication No.    | Country of registration         |
|                          |                             | TS 136 300                   |  | 14.2.0              | 7777 777      | KR20150136064                            | KR101985991 B1            | TRANSMITTING AND   | KOREA                   | CN20158053056   | CN106717060 A      | CHINA                           |
|                          |                             | TS 36.300                    |  | 14.2.0              |               |  |                           | RECEIVING A DATA AND<br>APPARATUSES THEREOI  | (REPUBLIC OF            | US201515516065  | US2017311362 A     |                                 |
| 2                        | 3GPP NR Release<br>15, 3GPP | TS 36.331<br>TS 38.212       |  | 14.2.0              | KT CORP [KR]  | KR20180050090                            | WB004004000               |  |                         | WO2015KR10391   | WO2016053027<br>A1 | Patent<br>Cooperation<br>Treaty |
|                          | Release-15 NR               | TS 38.213                    |  |                     | ook [kk]      | KK20180050090                            | KR20180129634<br>A        | Method for scheduling dat channel in new radio and                                       | A KOREA (REPUBLIC OF)   | CN201810501797  |                    |                                 |
| _                        |                             |                              |  |                     |               |  |                           | Apparatuses thereof  | (KEPOBLIC OF)           | US201815985883  |                    |                                 |
| 3                        | 3GPP NR Release             | TS 38.214                    |  |                     | KT CORP [KR]  | KR20180054207                            | KR20190008077             | 001 00 01 01   |                         | US201916357686  | US2019215212 A1    |                                 |
| - 1                      | Release-15 NR               | TS 38.331                    |  | 15.0.0              |               |  | A                         | CSI-RS Method for beam management by using CSI   | - (REPUBLIC OF)         | CN201810756991  | CN109257821 A      | CHINA                           |
| 4                        | 3GPP NR Release<br>15, 3GPP | TS 38.213                    |  |                     | KT CORP [KR]  | KR20180057278                            | I/men tener to            | Apparatuses thereof  |                         | US201816027937  | US2019020454 A1    | UNITED STATES                   |
|                          | Release-15 NR               | TS 38.214                    |  |                     | ook pag       | KK2010005/2/8                            | KR20190013452<br>A        | Method for frequency hopping to transmit and   | KOREA<br>(REPUBLIC OF)  | CN201810801096  | CN109309558 A      | CHINA                           |
| 5                        | 3GPP NR Release<br>15, 3GPP | TS 38.212                    |  |                     | KT CORP [KR]  | KR20180068747                            | KR20190017640             | receive uplink channel and<br>Apparatuses thereof  | KOREA<br>(REPUBLIC OF)  | US201816048210  | US2019036665 A1    |                                 |
|                          | Release-15 NR               |                              |  |                     | in som paig   | 1412010000747                            |                           | DMRS Method for<br>multiplexing DMRS and<br>data in new radio and<br>Apparatuses thereof |                         | CN201810869752  | CN109391458 A      | CHINA                           |
| 6                        | 3GPP NR Release             | 70.00.011                    |  |                     |               |  |                           |  |                         | US201816058140  | US10454643 B2      | UNITED STATES                   |
|                          | 15, 3GPP                    | TS 38.214                    |  |                     | KT CORP [KR]  | KR20180077435                            | KR20190031125             | DMRS Method for  | KOREA                   |                 |                    |                                 |
|                          | Release-15 NR               | N N                          | 1  |                     |               |  | A                         | controlling transmit power of DMRS in new radio and                                      | (REPUBLIC OF)           | CN20181185562   | CN109511162 A      | CHINA                           |
| 7 3                      | GPP NR Release              | TS 38,213                    |  | -                   | 1/2 0000 U.S. |  |                           | Apparatuses thereof  |                         | US201816131686  | US2019090199 A1    | UNITED STATES                   |
|                          | 15, 3GPP<br>Release-15 NR   |                              |  |                     | KT CORP [KR]  | KR20180056950                            | KR20190031119<br>A        | Method for transmitting and receiving transport  | KOREA<br>(REPUBLIC OF)  | CN20181118440   | CN109510691 A      | CHINA                           |
| 1                        |                             |                              |  |                     | 1             |  | DIOCK Dased on code block | (REPUBLIC OF)  | US201816128748          |                 | UNITED STATES      |                                 |
| 8 3                      | GPP NR Release              | TS 38.211                    |  |                     |               |  |                           | group and Apparatuses thereof  |                         |                 | OMITED STATES      |                                 |
|                          | 15, 3GPP<br>Release-15 NR   | GPP                          |  | - 1                 | KT CORP [KR]  | KR20180071730                            | KR20190038277             | TRS Method for   | KOREA                   | CN201811138879  | CN109586880 A      |                                 |
| 1                        | 1/010030-12 MK              |                              |  |                     |               |  | A                         | transmitting Tracking<br>Reference Signal in new   | (REPUBLIC OF)           |                 |                    | CHINA                           |
| 9 3                      | CDB ND Balance              |                              |  |                     |               |  | 1                         | radio and Apparatuses thereof  |                         |                 | OCA 19 104005 A1   | UNITED STATES                   |
|                          | GPP NR Release<br>15, 3GPP  | TS 38.212                    |  |                     | KT CORP [KR]  | KR20180077270                            | KR20190038279             | Apparatus and method of  | KOREA                   | ONOGO           |                    |                                 |
|                          | Release-15 NR               | TS 38.213                    |  |                     |               | 1  | A                         | PUCCH resource allocation  | KOREA<br>(REPUBLIC OF)  | CN201811148762  | CN109586883 A      | CHINA                           |
|                          | GPP NR Release<br>15, 3GPP  | TS 138 331                   |  | 15.2.0              | KT CORP [KR]  | KR20180092635                            | KR20190038300             | for new radio Method for switching   | V0754                   |                 |                    | UNITED STATES                   |
|                          | Release-15 NR               | TS 38.212                    |  | 1                   |               |  | A                         | bandwidth part in new  | (REPUBLIC OF)           | CN201811147708  | CN109586881 A      | CHINA                           |
|                          |                             | TS 38.213<br>TS 38.331       |  | 45.00               |               |  |                           | radio and Apparatuses thereof  |                         | KR20180084727   | KR20190038291<br>A | KOREA<br>(REPUBLIC OF)          |
| 11 30                    | GPP NR Release              | TS 38.212                    |  | 15.2.0              | KT CORD IVE   | 1 10000000                               |                           |  |                         | US201816147638  |                    | UNITED STATES                   |
|                          | 15, 3GPP<br>Release-15 NR   | TS 38.213                    | 3GPP KT CORP [KR] KR2018009677                         | KR20180096773       | KR20190038991 | HARQ ACK/NACK<br>Apparatus and method of | KOREA                     |  | CN109600212 A           | CHINA           |                    |                                 |
|                          |                             |                              |  |                     |               |  |                           | HARQ ACK/NACK  | (REPUBLIC OF)           |                 | KR20190038983      | KOREA<br>(REPUBLIC OF)          |
|                          |                             |                              |  |                     |               |  |                           | feedback information for new radio   |                         | US201816149344  |                    | UNITED STATES                   |



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| 12 | 3GPP NR Release           | TS 38,214  | T T    | 1/7 0000 1/71  | 1,000,000,000   | T.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |  |                        |                | 1                  |                           |
|----|---------------------------|------------|--------|----------------|-----------------|--|--|------------------------|----------------|--------------------|---------------------------|
| 12 | 15, 3GPP                  | 15 30.214  |        | KT CORP [KR]   | KR20180132306   | KR20190085838                          | Methods for data<br>modulation and coding for<br>new radio and Appratuses<br>thereof | KOREA<br>(REPUBLIC OF) | CN20191011509  | CN110034906 A      | CHINA                     |
|    | Release-15 NR             |            |        |                |                 |  |  | (KEPOBLIO OF)          | EP20190150559  | EP3512138 A1       | European Patent<br>Office |
|    |                           |            |        |                |                 |  |  |                        | KR20180058965  | KR20190085820<br>A | KOREA<br>(REPUBLIC OF)    |
|    |                           |            |        |                |                 |  |  |                        | US201916241086 | US2019215095 A1    | UNITED STATES             |
| 13 | 3GPP-Release-15           | TS 136 300 | 15.2.0 | KT CORP [KR]   | KR20180107317   | KR20190060657                          | LTE sTTI Method for multi  | KOREA                  | CN201811404747 | CN109842952 A      | CHINA                     |
|    |                           | TS 136 212 | 15.2.1 |                |                 | A                                      | sTTI based scheduling for transmitting and receiving                                 | (REPUBLIC OF)          | US201816197487 | US2019165895 A1    | UNITED STATES             |
|    |                           | TS 136 213 | 15.2.0 | 1              |                 |  | data channel in LTE and  |                        |                |                    |                           |
|    |                           | TS 36.213  | 15.2.0 |                |                 |  | Apparatuses thereof  |                        |                |                    |                           |
|    |                           | TS 36.300  | 15.2.0 |                |                 |  |  |                        |                |                    |                           |
|    |                           | TS 36.212  | 15.2.1 |                |                 |  |  |                        |                |                    |                           |
| 14 | 3GPP NR Release           | TS 124 501 | 15.0.0 | KT CORP [KR]   | KR20180096477   | KR20190028282                          | Methods for controlling  | KOREA                  | US201816125863 | US2019082376 A1    | UNITED STATES             |
|    | Release-15 NR             | TS 138 331 | 15.3.0 |                |                 | A                                      | access control in next   | (REPUBLIC OF)          |                |                    |                           |
|    |                           | TS 24.501  | 15.0.0 |                |                 | 1                                      | network AND Apparatuses  |                        |                |                    |                           |
|    |                           | TS 38.331  | 15.3.0 |                |                 |  | thereof  |                        |                |                    |                           |
| 15 | 3GPP-Release-15           | TS 136 331 | 15.3.0 | KT CORP [KR]   | KR20180056942   | KR20190012096                          | RRC IDLE Methods for   | KOREA                  | CN201810789449 | CN109309969 A      | CHINA                     |
|    |                           | TS 36.331  | 15.3.0 |                |                 | A                                      | controlling measurement<br>process in RRC IDLE mode<br>and Apparatuses thereof       | (REPUBLIC OF)          | US201816040924 | US2019037425 A1    | UNITED STATES             |
| 16 | 3GPP-Release-15           | TS 136 321 | 15.2.0 | KT CORP [KR]   | KR20180124177   | KR20190076834                          | Methods for controlling  | KOREA                  | CN201811522932 | CN1400000000 A     | CHINA                     |
|    |                           | TS 136 331 | 15.3.0 | in com pag     |                 | A                                      | SCell state and  | (REPUBLIC OF)          | US201816227392 | CN109963296 A      | CHINA                     |
|    |                           | TS 36.321  | 15.2.0 |                |                 |  | Apparatuses thereof  |                        | 03201010227392 | US2019200413 A1    | UNITED STATES             |
|    |                           | TS 36.331  | 15.3.0 |                |                 |  |  |                        |                |                    |                           |
| 17 | 3GPP-Release-15           | TS 136 321 | 15,2,0 | KT CORP [KR]   | KR20180145158   | KR20190083612                          | Methods for controlling  | KOREA                  | CN201811632751 | CN110012499 A      | CHINA                     |
|    |                           | TS 136 331 | 15.3.0 | itt oota paq   |                 | A                                      | SCell state and  | (REPUBLIC OF)          | US201816236640 | US2019208429 A1    | UNITED STATES             |
|    |                           | TS 136 213 | 15.2.0 |                |                 |  | Apparatuses thereof  |                        | 03201010230040 | 032013208423 AT    | ONITEDSIATES              |
|    |                           | TS 36.213  | 15.2.0 |                |                 |  |  |                        |                |                    |                           |
|    |                           | TS 36.321  | 15.2.0 |                |                 |  |  |                        |                |                    |                           |
|    |                           | TS 36.331  | 15.3.0 |                |                 |  |  |                        |                |                    |                           |
| 18 | 3GPP NR Release           | TS 138 463 | 15,0.0 | KT CORP [KR]   | KR20180088414   | KR20190022322                          | Methods for controlling  | KOREA                  | US201816112619 | US2019069333 A1    | UNITED STATES             |
|    | 15, 3GPP<br>Release-15 NR | TS 38,401  |        | ,              |                 | A                                      | mobility of UE and   | (REPUBLIC OF)          | 00201010112019 | 032018009333 AT    | ONITED STATES             |
|    | 1/010030-12 141/          | TS 38.463  | 15.0.0 |                |                 |  | Apparatuses thereof  |                        |                |                    |                           |
| 19 | 3GPP NR Release           | TS 138 425 | 15.2.0 | KT CORP [KR]   | KR20180091232   | KR20190088861                          | NR LTE Methods for   | KOREA                  | US201816190355 | US2019229864 A1    | UNITED STATES             |
|    | 15, 3GPP<br>Release-15 NR | TS 38.425  | 15.2.0 | , and a second |                 | A                                      | controlling data transfer using interworking   | (REPUBLIC OF)          | 00201010130333 | 032018228004 A1    | UNITED STATES             |
|    |                           |            |        |                |                 |  | Interface between NR and LTE RAN systems And   |                        |                |                    |                           |
| 20 | 3GPP NR Release           | TS 137 340 | 15.3.0 | 2222 222       | KR20190020835   | KR20190116906                          | Apparatuses thereof  Methods for controlling   | KOREA                  | 11600404607000 | LIDONADA CONC. 1.4 |                           |
|    | 15, 3GPP<br>Release-15 NR | TS 37.340  | 15.3.0 | 1111111        | 17/12/10/02/033 | A                                      | data volume of secondary   | (REPUBLIC OF)          | US201916373808 | US2019312980 A1    | UNITED STATES             |
| 21 | 3GPP-Release-16           | TS 38.211  |        | KT CORP [KR]   | KR20190015479   | KR20190098708                          | Method for Transmitting  | KOREA                  | WO2019KR01770  | WO2019160332       | Patent                    |
|    |                           | TS 38.212  |        |                |                 | A                                      | Uplink data and Apparatus  | (REPUBLIC OF)          |                | A1                 | Cooperation               |
|    |                           | TS 38.213  |        |                |                 |  | thereof  |                        |                |                    | Treaty                    |
| 22 | 3GPP-Release-16           | TS 38.211  |        | 7777 777       | KR20190035586   | KR20190114848                          | Method for Transmitting  | KOREA                  | WO2019KR03707  | WO2019190264       | Patent                    |
|    |                           | TS 38.212  |        |                |                 | A                                      | Uplink data channel and  | (REPUBLIC OF)          |                | A1                 | Cooperation               |
|    |                           | TS 38.213  |        |                |                 |  | Apparatus thereof  |                        |                |                    | Treaty                    |
|    |                           |            |        |                |                 |  |  |                        |                |                    |                           |



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| 23 | 3GPP-Release-16              | TS 38.211<br>TS 38.212<br>TS 38.213                            |  | 7777 777                       | KR20190036129  | KR20190114871<br>A | Methods for controlling uplink data channel trasmission power and Apparatus thereof   | KOREA<br>(REPUBLIC OF) | WO2019KR03709                   | WO2019190265<br>A1                 | Patent<br>Cooperation<br>Treaty          |
|----|------------------------------|--|--|--------------------------------|----------------|--------------------|---|------------------------|---------------------------------|------------------------------------|--|
| 24 | 3GPP-Release-16              | TS 38.331  |  | KT CORP [KR]                   | KR20190009663  | KR20190098692<br>A | RRC Method for processing a RRC message of relay node and Apparatuses thereof   | KOREA<br>(REPUBLIC OF) | WO2019KR01614                   | WO2019160280<br>A1                 | Patent<br>Cooperation<br>Treaty          |
| 25 | 3GPP-Release-16              | TS 38.331  |  | KT CORP [KR]                   | KR20190009666  | KR20190098693<br>A | Methods for processing<br>Uplink user data of relay<br>node and Apparatuses<br>thereof  | KOREA<br>(REPUBLIC OF) | WO2019KR01616                   | WO2019160282<br>A1                 | Patent<br>Cooperation<br>Treaty          |
| 26 | 3GPP-Release-16              | TS 38.331  |  | KT CORP [KR]                   | KR20180043161  | KR20180118047<br>A | Methods for performing<br>terminal-based handover<br>and Apparatuses thereof  | KOREA<br>(REPUBLIC OF) | WO2018KR04383                   | WO2018194326<br>A1                 | Patent<br>Cooperation<br>Treaty          |
| 27 | 3GPP-Release-11              | TS 36.211  |  | KT                             | KR20110071096  | KR101680212 B1     | CHANNEL STATUS  | KOREA                  | US201214123188                  | US9241283 B2                       | UNITED STATES                            |
|    |                              | TS 36.212<br>TS 36.213   |  | CORPORATION,<br>???? ???       |                |                    | INFORMATION TRANSMITTING METHOD OF USER EQUIPMENT, USER EQUIPMENT THEREOF, CHANNEL STATUS INFORMATION RECEIVING METHOD OF TRANSMISSION POINT, AND TRANSMISSION POINT THEREOF                  | (REPUBLIC OF)          | WO2012KR05673                   | WO2013012235<br>A3                 | Patent<br>Cooperation<br>Treaty          |
| 28 | 3GPP-Release-11,<br>COMP_LTE | TS 136 211<br>TS 36.211  | 11.0.0<br>11.0.0                               | KT<br>CORPORATION,<br>???? ??? | KR20120103523  | KR101619105 B1     | METHOD FOR TRANSMITTING UPLINK DEMODULATION REFERENCE SIGNAL, TERMINAL THEREOF, METHOD FOR PROCESSING UPLINK DEMODULATION REFERENCE SIGNAL AND TRANSMISSION/RECEPTIO N POINT THEREOF          | KOREA<br>(REPUBLIC OF) | WO2013KR03793                   | WO2013176414<br>A1                 | Patent<br>Cooperation<br>Treaty          |
| 29 | 3GPP-Release-11,             | TS 136 211   | 11.0.0   | KT                             | KR20120141245  | KR101647868 B1     | METHOD FOR  | KOREA                  | US201314406779                  | US9756616 B2                       | UNITED STATES                            |
|    | COMP_LTE                     | TS 36.211  | 11.0.0   | CORPORATION,<br>???? ???       |                |                    | TRANSMITTING UPLINK PHYSICAL CHANNEL AND SOUNDING REFERENCE SIGNAL IN UPLINK RELATED UPLINK PHYSICAL CHANNEL AND TERMINAL THEREOF   | (REPUBLIC OF)          | WO2013KR04013                   | WO2013187603<br>A1                 | Patent<br>Cooperation<br>Treaty          |
| 30 | 3GPP-Release-11,<br>COMP_LTE | TS 136 211 TS 136 212 TS 136 213 TS 36.211 TS 36.212 TS 36.213 | 11.0.0<br>11.0.0<br>11.0.0<br>11.0.0<br>11.0.0 | KT<br>CORPORATION,<br>???? ??? | KR20120145631  | KR101669701 B1     | METHOD FOR PROVIDING INFORMATION MAPPING OF PHYSICAL UPLINK SHARED CHANNEL, TRANSMISSION/RECEPTIO N POINT THEREOF, METHOD FOR TRANSITTING PHYSICAL UPLINK SHARED CHANNEL AND TERMINAL THEREOF | KOREA<br>(REPUBLIC OF) | US201314407984<br>WO2013KR04233 | US9490942 B2<br>WO2014003313<br>A1 | UNITED STATES  Patent Cooperation Treaty |
| 31 | 3GPP-Release-11, TS 136 211  | 11.0.0   | KT   | KR20130056971                  | KR101669710 B1 | METHODS OF         | KOREA   | US201314410194         | US9615289 B2                    | UNITED STATES                      |  |
|    | COMP_LTE                     | TS 136 212   | 11.0.0   | CORPORATION,                   |                |                    | CONTROLLING<br>TRANSMISSION OF<br>UPLINK AND  | (REPUBLIC OF)          | WO2013KR05885                   | WO2014007531                       | Patent                                   |
|    |                              | TS 136 213   | 11.0.0   |                                |                |                    |   |                        |                                 | A1                                 | Cooperation<br>Treaty                    |
|    |                              | TS 36.211  | 11.0.0   |                                |                |                    | APPARATUSES THEREOF IN MOBILE   |                        |                                 |                                    |  |
|    |                              | TS 36.212  | 11.0.0   |                                |                |                    | COMMUNICATION<br>NETWORKS   |                        |                                 |                                    |  |
|    |                              | TS 36.213  | 11.0.0   |                                |                |                    |   |                        |                                 |                                    |  |



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|    |                              |            |        |              |                |                    | ·  |                        |                |                    |                       |
|----|------------------------------|------------|--------|--------------|----------------|--------------------|--|------------------------|----------------|--------------------|-----------------------|
| 32 | 3GPP-Release-11,             | TS 136 211 | 11.0.  |              | KR20130068121  | KR101589911 B1     | METHODS AND  | KOREA                  | US201314419270 | US9544111 B2       | UNITED STATES         |
|    | COMP_LTE                     | TS 136 212 | 11.0.  | CORPORATION, |                |                    | APPARATUSES FOR POWER CONTROL OF                   | (REPUBLIC OF)          | WO2013KR06740  | WO2014021589       | Patent                |
|    |                              | TS 136 213 | 11.0.  |              |                |                    | RANDOM ACCESS                                      |                        |                | A1                 | Cooperation<br>Treaty |
|    |                              | TS 36.211  | 11.0.  |              |                |                    |  |                        |                |                    |                       |
|    |                              | TS 36.212  | 11.0.  |              |                |                    |  |                        |                |                    |                       |
|    |                              | TS 36.213  | 11.0.  |              |                |                    |  |                        |                |                    |                       |
| 33 | 3GPP-Release-11,<br>COMP_LTE | TS 136 211 | 11.0.  | CODDODATION  | KR20130089752  | KR101619400 B1     | METHODS AND APPARATUSES FOR                        | KOREA<br>(REPUBLIC OF) | US201314421562 | US2015223231 A1    | UNITED STATES         |
|    | 0011117_212                  | TS 136 212 | 11.0.  | 7777 777     |                |                    | CONTROLLING  | (KEFOBEIO OF)          | WO2013KR07218  | WO2014027804<br>A1 | Patent<br>Cooperation |
|    |                              | TS 136 213 | 11.0.  | 1            |                |                    | TRANSMISSION OF UPLINK CHANNEL AND                 |                        |                | n'                 | Treaty                |
|    |                              | TS 36.211  | 11.0.  | 1            |                |                    | SIGNALS  |                        |                |                    |                       |
|    | 1                            | TS 36.212  | 11.0.4 | 1            |                |                    |  |                        |                |                    |                       |
|    |                              | TS 36.213  | 11.0.4 |              |                |                    |  |                        |                |                    |                       |
| 34 | 3GPP NR Release              | TS 38.211  |        | KT CORP [KR] | KR20160087298  | KR20170093675      | METHODS FOR TRANSMITTING AND                       | KOREA<br>(REPUBLIC OF) | US201716075591 | US2019044584 A1    |                       |
| l  | Release-15 NR                | TS 38.212  |        |              |                |                    | RECEIVING SIGNALS IN                               | (1121 05210 01 )       | WO2017KR00507  | WO2017135593<br>A1 | Patent<br>Cooperation |
|    |                              | TS 38.213  |        |              |                |                    | mmWAVE<br>COMMUNICATION                            |                        |                | <u> </u>           | Treaty                |
|    |                              |            |        |              |                |                    | SYSTEMS WITH MASSIVE ANTENNA ARRAYS AND            |                        |                |                    |                       |
|    |                              |            |        |              |                |                    | APPARATUSES THEREOF                                |                        |                |                    |                       |
| 35 | 3GPP NR Release              | TS 38.211  |        | KT CORP [KR] | KR20160087313  | KR20170091489      | HARQ METHODS FOR                                   | KOREA                  | US201716073769 | US2019036654 A1    | UNITED STATES         |
|    | 15, 3GPP<br>Release-15 NR    | TS 38.212  |        |              |                | A                  | CONTROLLING DOWNLINK HARQ IN WIRELESS              | (REPUBLIC OF)          | WO2017KR00508  | WO2017131374       | Patent                |
|    |                              | TS 38.213  |        |              |                |                    | COMMUNICATION                                      |                        |                | A1                 | Cooperation<br>Treaty |
|    |                              |            |        |              |                |                    | SYSTEMS AND APPARATUS THEREOF                      |                        |                |                    |                       |
| 36 | 3GPP NR Release              | TS 38.211  |        | KT CORP [KR] | KR20170014774  | KR20170093720      | METHODS OF DOWNLINK                                | KOREA                  |                |                    |                       |
|    | 15, 3GPP<br>Release-15 NR    | TS 38.212  |        |              |                | A                  | SYNCHRONIZATION<br>SIGNAL TRANSMISSION             | (REPUBLIC OF)          |                |                    |                       |
|    |                              | TS 38.213  |        |              |                |                    | FOR NEW FRAME                                      |                        |                |                    |                       |
|    |                              |            |        |              |                |                    | STRUCTURE AND APPARATUSES THEREOF                  |                        |                |                    |                       |
| 37 | 3GPP NR Release              | TS 38.211  |        | KT CORP [KR] | KR20160087324  | KR20170101752      | METHODS FOR  | KOREA                  | US201716075591 | US2019044584 A1    | UNITED STATES         |
|    | 15, 3GPP<br>Release-15 NR    | TS 38.212  |        |              |                | A                  | TRANSMITTING AND RECEVING REFERENCE                | (REPUBLIC OF)          | WO2017KR00507  | WO2017135593       | Patent                |
|    | 10.000                       | TS 38.213  |        |              | 1              |                    | SIGNALS AND  |                        |                | A1                 | Cooperation<br>Treaty |
|    |                              |            |        |              |                |                    | FEEDBACKS IN mmWAVE COMMUNICATION                  |                        |                |                    | 110019                |
|    |                              |            |        |              |                |                    | SYSTEMS AND APPARATUSES THEREOF                    |                        |                |                    |                       |
| 38 | 3GPP NR Release              | TS 38.211  |        | KT CORP [KR] | KR20160087320  | KR20170101751      | METHODS FOR TRACKING                               | KOREA                  |                |                    |                       |
| 36 | 15, 3GPP                     | TS 38.212  |        | AT OOKE [AK] | 14420100001320 | A A                | AND CONTROLLING                                    | (REPUBLIC OF)          |                |                    |                       |
|    | Release-15 NR                | TS 38.213  |        |              |                |                    | BEAMS IN WIRELESS COMMUNICATION                    |                        |                |                    |                       |
|    |                              | 10 30.213  |        |              |                |                    | SYSTEMS USING                                      |                        |                |                    |                       |
|    |                              |            |        |              |                | ľ                  | mmWAVE FREQUENCY<br>BANDS AND                      |                        |                |                    |                       |
|    |                              |            |        |              |                |                    | APPARATUSES THEREOF                                |                        |                |                    |                       |
| 39 | 3GPP NR Release              | TS 38.211  |        | KT CORP [KR] | KR20170142190  | KR20180048371<br>A | Method for transmitting and receiving data channel | KOREA<br>(REPUBLIC OF) | WO2017KR12118  | WO2018080274<br>A1 | Patent                |
|    | Release-15 NR                | TS 38.212  |        |              |                | ^                  | for new radio and                                  | (NEPOBLIC OF)          |                | MT MT              | Cooperation<br>Treaty |
|    |                              | TS 38.213  |        |              |                |                    | Apparatuses thereof                                |                        |                |                    | -                     |
| 40 | 3GPP NR Release              | TS 38.211  |        | KT CORP [KR] | KR20180060204  | KR20180131427      | DMRS Method for allocating and multiplexing        | KOREA<br>(REPUBLIC OF) | WO2018KR06159  | WO2018221960<br>A1 | Patent<br>Cooperation |
|    | Release-15 NR                | TS 38.212  |        |              |                | _ ^                | DMRS port in new radio                             | (IVEROBLIC OF)         |                | 71                 | Treaty                |
|    |                              | TS 38.213  |        |              |                |                    | and Appratuses thereof                             |                        |                |                    |                       |



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| 41 | 3GPP NR Release<br>15, 3GPP<br>Release-15 NR | TS 38.211<br>TS 38.212<br>TS 38.213                |                                      | KT CORP [KR] | KR20180079412 | KR20190008113<br>A | Method for transmitting transmission block for new radio and Apparatuses thereof                                       | KOREA<br>(REPUBLIC OF) | WO2018KR07837  | WO2019013540<br>A1 | Patent<br>Cooperation<br>Treaty |
|----|--|--|--------------------------------------|--------------|---------------|--------------------|--|------------------------|----------------|--------------------|---------------------------------|
| 42 | 3GPP NR Release<br>15, 3GPP<br>Release-15 NR | TS 38.211<br>TS 38.212<br>TS 38.213                |                                      | KT CORP [KR] | KR20180088382 | KR20190013636<br>A | DMRS Method for configuring additional DMRS in new radio and Apparatuses thereof                                       | KOREA<br>(REPUBLIC OF) |                |                    |                                 |
| 43 | 3GPP NR Release<br>15, 3GPP<br>Release-15 NR | TS 38.211<br>TS 38.212<br>TS 38.213                |                                      | KT CORP [KR] | KR20180170113 | KR20190080783<br>A | Method for transmitting<br>and receiving control<br>information for new radio<br>and Apparatuses thereof               | KOREA<br>(REPUBLIC OF) | WO2018KR16811  | WO2019132559<br>A1 | Patent<br>Cooperation<br>Treaty |
| 44 | 3GPP NR Release<br>15, 3GPP<br>Release-15 NR | TS 38.211<br>TS 38.212<br>TS 38.213                |                                      | KT CORP [KR] | KR20170106004 | KR20180113138<br>A | METHOD AND APPARATUS FOR TRANSMITTING AND RECEIVING DATA BASED ON MULTIPLE BEAM  | KOREA<br>(REPUBLIC OF) |                |                    |                                 |
| 45 | 3GPP-Release-15                              | TS 36.211<br>TS 36.212<br>TS 36.213                | 15.1.0<br>15.1.0<br>15.1.0           | KT CORP [KR] | KR20160032626 | KR20170109153<br>A | Short TTI PUCCH Apparatus and method of PUCCH configuration based on short TTI frame structure                         | KOREA<br>(REPUBLIC OF) |                |                    |                                 |
| 46 | 3GPP-Release-15                              | TS 36.211<br>TS 36.212<br>TS 36.213                | 15.1.0<br>15.1.0<br>15.1.0           | KT CORP [KR] | KR20170079516 | KR20180004392<br>A | METHODS FOR<br>CONFIGURING PUCCH IN<br>A SHORT TTI FRAME<br>STRUCTURE AND<br>APPARATUSES THEREOF                       | KOREA<br>(REPUBLIC OF) | WO2017KR06843  | WO2018004256<br>A1 | Patent<br>Cooperation<br>Treaty |
| 47 | 3GPP-Release-15                              | TS 36.211<br>TS 36.212<br>TS 36.213                | 15.1.0<br>15.1.0<br>15.1.0           | KT CORP [KR] | KR20170147747 | KR20180053236<br>A | Methods for transmitting channel quality indication information in a short TTI frame structure and Apparatuses thereof | KOREA<br>(REPUBLIC OF) | WO2017KR12745  | WO2018088848<br>A1 | Patent<br>Cooperation<br>Treaty |
| 48 | 3GPP-Release-12                              | TS 36.331  |                                      | KT CORP [KR] | KR20150034719 | KR20150114890<br>A | METHODS FOR<br>CONTROLLING THE<br>SECONDARY CELL<br>OPERATION OF A MOBILE<br>STATION AND<br>APPARATUSES THEREOF        | KOREA<br>(REPUBLIC OF) | WO2015KR02852  | WO2015152554<br>A1 | Patent<br>Cooperation<br>Treaty |
| 49 | 3GPP NR Release<br>15, 3GPP<br>Release-15 NR | TS 138 300<br>TS 138 331<br>TS 38.300<br>TS 38.331 | 15.2.0<br>15.3.0<br>15.2.0<br>15.3.0 | 7777 777     | KR20170116319 | KR102022846 B1     | Methods for controlling the<br>UE connection status and<br>Appartuses thereof  | KOREA<br>(REPUBLIC OF) | US201715716595 | US10440691 B2      | UNITED STATES                   |
| 50 | 3GPP-Release-16                              | TS 38.331  |                                      | KT CORP [KR] | KR20180079460 | KR20190008114<br>A | Methods for controlling a<br>carrier aggregation for next<br>generation wireless<br>network and Apparatuses<br>thereof | KOREA<br>(REPUBLIC OF) | WO2018KR07844  | WO2019013543<br>A1 | Patent<br>Cooperation<br>Treaty |
| 51 | 3GPP-Release-16                              | TS 38.331  |                                      | KT CORP [KR] | KR20180111250 | KR20190034094<br>A | Methods for processing data of relay node and Apparatuses thereof  | KOREA<br>(REPUBLIC OF) | WO2018KR11055  | WO2019059638<br>A1 | Patent<br>Cooperation<br>Treaty |
| 52 | 3GPP NR Release<br>15, 3GPP<br>Release-15 NR | TS 38.331  |                                      | KT CORP [KR] | KR20170118911 | KR20180033443<br>A | Methods for changing a connection of a UE and Apparatuses thereof  | KOREA<br>(REPUBLIC OF) | WO2017KR10406  | WO2018056718<br>A1 | Patent<br>Cooperation<br>Treaty |
| 53 | 3GPP NR Release<br>15, 3GPP<br>Release-15 NR | TS 38.300  | 15.0.0                               | KT CORP [KR] | KR20170127416 | KR20180039567<br>A | Methods for providing<br>network service using<br>network slicing and<br>Apparatuses thereof                           | KOREA<br>(REPUBLIC OF) |                |                    | •                               |

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